United States Coast Guard
Maintenance and Logistics Command, Atlantic (MLCA)

MLCA NAVAL ENGINEERING DIRECTIVE (MLCA NED) – 5890-02

INSPECTION AND TEST PROCEDURE FOR BUOY CRANE MODEL SB230-42 ON BOARD WLM 551-564

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ABSTRACT

This directive covers the inspection and testing of the Bouy Crane Model TB90-60 onboard WLM 551-564. The procedures listed here are based upon guidance of the United States Coast Guard Naval Engineering Manual, COMDTINST M9000.6E, manufacturers' recommendations and other noted references.

FEEDBACK & UPDATES

The latest version of this document is available at:

http://www.uscg.mil/mlclant/VDiv/specs/default.htm

Beneficial comments, recommendations, additions, deletions and other pertinent data which may be of use to improve this document can be provided via the same website.

REVISION RECORD

Revision Date	Summary Of Changes	INITIALS
3/01/05	Initial Release	JW

REFERENCES

The following references were used to develop this document.

A. Naval Engineering Manual (COMDTINST M9000.6E)

B. Maintenance Manual for Appleton Buoy Crane Model SB230-42.

C. Coast Guard Maintenance and Logistics Command Atlantic (MLCA), Standard Specification 5000_STD, 2004 Edition, Auxiliary Machinery Systems

Personnel

The roles of operator, rigger, and inspector are designated as follows: the operator shall operate the system as specified, the rigger shall perform all necessary tasks to facilitate the specified operation, and the inspector shall perform all specified inspections and verifications. A repair facility may be required to fill one or more of these three roles, and shall perform each task assigned. The following bullet styles denote:

- An operational task that shall be performed by one or more operators or a rigging task shall be performed by one or more riggers, as applicable.

☐ An inspection or verification that shall be performed by one or more inspectors.

Required Test Weights

Main Hoist Static Load Test Weight - 30,000 (+1,500 -0) pounds

Main Hoist Dynamic Load Test Weight - 25,000 (+1,250 -0) pounds

Main Hoist Rated Load Test Weight - 20,000 (+0 -1000) pounds

Auxiliary Hoist Static Load Test Weight - 13,500 (+675 -0) pounds

Auxiliary Hoist Dynamic Load Test Weight - 10,800 (+0 -540) pounds

Auxiliary Hoist Rated Load Test Weight - 9,000 (+0 -450) pounds

Emergency Brake Release Test Weight - min 2,000 Pounds

Part 1. Visual Inspection.

Visually inspect the following components for corrosion, wear, or damage and determine that the system is safe to handle weights.

1.1 Load-Bearing Machinery and Structure:

- ☐ Main fall block and hook assemblies.
- ☐ Auxiliary hook assembly.
- ☐ Main hoist wire rope assembly.
- ☐ Auxiliary hoist wire rope assembly.
- ☐ Main hoist sheave assemblies.
- ☐ Auxiliary hoist sheave assemblies.
- ☐ Swivel head bearing assembly.
- ☐ Main hoist drums and winch assemblies.
- ☐ Auxiliary hoist drums and winch assemblies.
- ☐ Boom structure.
- ☐ Turret structure.
- ☐ Luff hydraulic cylinder and its attachment points (pins, bushings, lock plates).
- ☐ Boom attachment points (pins, bushings, lock plates).
- ☐ Pedestal structure and turret-to-pedestal foundation bolts.

1.2 Electrical Safety Devices:

- ☐ Main fall anti-two-block device.
- ☐ Auxiliary fall anti-two-block device.
- ☐ Main fall load cells (sheave "load pin").
- ☐ Auxiliary fall load cells (sheave "load pin").
- ☐ Line tension switch assembly.

- ☐ Swing limit switch.

1.3 Hydraulic Components:

- ☐ Main and auxiliary hoist motors, brakes, and associated piping.
- ☐ Hose assemblies between the turret mounted valves and the boom.
- ☐ Hose assemblies between main and aux hoist manifolds on the boom.
- ☐ Turret mounted directional control valves and manifolds.
- ☐ Swing drive motors, brakes, and associated piping.
- ☐ Emergency release manifold and valves.
- ☐ Hand pump.
- ☐ Luff cylinder flow control valve.

1.4 Miscellaneous Electrical and Mechanical Components:

- ☐ Boom angle sensor.
- ☐ Swing sensor.
- ☐ Control console in the crane shack and cab.
- ☐ All electrical cabling.
- ☐ All electrical enclosures.
- ☐ Flood light on boom.

Part 2. No-Load Operational Test.

- Attach a weight (200 pounds or less) to the hook of the hoist being operated, if necessary, so that adequate reeving tension in the wire rope is maintained.

- Operate the main hoist, aux hoist, boom, boom extension, and swing drives through their full ranges of motion.

Verify all components listed below are in working order and further verify that the system is safe to handle test weights.

☐ Control Console

☐ Luffing Cylinders

☐ Boom Extension Cylinder

☐ Swing Drives and Turret

☐ Main and Aux Hoist Assemblies

☐ Sheave Assemblies

☐ Indicator Lights

Part 3. Aux Hoist Weight Test

3.1 Auxiliary Hoist Static Load Test

Warning!

Do not attempt to operate the Auxiliary Hoist with the static load applied to the Auxiliary Hoist hook.

- Lower the boom as much as practicable.

- Suspend a test weight of 13,500 (+675 -0) pounds from the Auxiliary Hoist hook using a separate crane, a fork truck, or other external means.

- Leave the test weight on the hook for 10 minutes.

☐ Verify that the Auxiliary Hoist brake does not slip.

- Remove the test weight from the Auxiliary Hoist hook.

☐ Verify the Auxiliary Hoist drum, winch, and sheave attachment points (load-bearing fasteners and welds) have no permanent deformation or damage.

☐ Verify that the Auxiliary Hoist wire rope, end fittings, and hook assembly have no permanent deformation or damage.

3.2 Auxiliary Hoist Dynamic Load Test

- Pick up a test weight of 10,800 (+0 -540) pounds using the Auxiliary Hoist hook.

- Raise and lower the test weight through 3 complete cycles, and through as large a hoisting range as practicable.

☐ Verify that no unusual noise or vibration is emitted from the hoist assembly or sheaves.

- Stop and hold the test weight for 30 seconds once in the up direction, then once in the down direction. Do this one time during each of the 3 cycles.

☐ Verify that the Auxiliary Hoist brake stops and controls the test weight without any noticeable slippage or overheating.

- Remove the test weight from the Auxiliary hoist hook.

☐ Verify the Auxiliary Hoist drum, winch, and sheave attachment points (load-bearing fasteners and welds) have no permanent deformation or damage.

☐ Verify that the Auxiliary Hoist wire rope, end fittings, and hook assembly have no permanent deformation or damage.

☐ Verify that there are no leaks from hydraulic hoses or tubing.

3.3 Auxiliary Hoist Rated Load Test

- Pick up a test weight of 9,000 (+0 -450) pounds using the Auxiliary Hoist hook.

- Raise and lower the test weight through 10 complete cycles, and through as large a hoisting range as practicable.

☐ Verify that no unusual noise or vibration is emitted from the hoist assembly or sheaves.

- Stop and hold the test weight for 30 seconds once in the up direction, then once in the down direction. Do this one time during 3 of the 10 cycles.

☐ Verify that the Auxiliary Hoist brake stops and controls the test weight without any noticeable slippage or overheating.

- Remove the test weight from the Auxiliary hoist hook.

☐ Verify the Auxiliary Hoist drum, winch, and sheave attachment points (load-bearing fasteners and welds) are in good condition.

☐ Verify that the Auxiliary Hoist wire rope, end fittings, and hook assembly have no permanent deformation or damage.

☐ Verify that there are no leaks from hydraulic hoses or tubing.

Part 4. Main Hoist, Boom, and Turret Weight Test.

4.1 Main Hoist Static Load Test

Warning!

Do not attempt to operate the Main Hoist, the boom, or the turret with the static load applied to the Main Hoist hook.

- Lower and retract the boom as much as practicable.

- Suspend a test weight of 30,000 (+1,500 -0) pounds from the Main Hoist hook using a separate crane, fork truck, or other external means.

- Leave the test weight on the hook for 10 minutes.

☐ Verify that the Main Hoist brake does not slip.

☐ Verify the luff cylinder does not drift or leak.

- Remove the test weight from the Main Hoist hook.

☐ Verify that the Main Hoist drum, winch, and sheave attachment points (load-bearing fasteners and welds) are in good condition.

☐ Verify that the Main Hoist wire rope, end fittings, and hook assembly have no permanent deformation or damage.

4.2 Main Hoist Dynamic Load Test

- Pick up a test weight of 25,000 (+1,250 -0) pounds using the Main Hoist hook.

- Raise and lower the test weight through 3 complete cycles, and through as large a hoisting range as practicable.

- Stop and hold the test weight for 30 seconds once in the up direction, then once in the down direction. Do this one time during each of the 3 cycles.

☐ Verify that the Main Hoist brake stops and controls the test weight without any noticeable slippage or overheating.

☐ Verify that no unusual noise or vibration is emitted from the hoist assembly or sheaves.

- Raise and lower the boom through 3 complete cycles, and through as large a range as practicable.

- Stop and hold the test weight for 30 seconds once in the up direction, then once in the down direction. Do this one time during each of the 3 cycles.

- Extend and retract the boom through 3 complete cycles, and through as large a range as practicable.

☐ Verify that the luff cylinders and boom extension cylinder do not drift, leak, or bind during operation.

- Rotate the turret through 3 complete cycles and through as large a range as practicable.

- Stop rotating the turret once in the clockwise direction, then once in the counterclockwise. Do this one time during each of the 3 cycles.

☐ Verify the swing drive brakes stop and control the turret without any noticeable slippage or overheating.

☐ Verify that no unusual noise or vibration is emitted from the swing drives or the turntable bearing assembly.

- Remove the test weight from the Main hoist hook.

☐ Verify the Main Hoist drum, winch, and sheave attachment points (load-bearing fasteners and welds) are in good condition.

☐ Verify that the Main Hoist wire rope, end fittings, and hook assembly have no permanent deformation or damage.

☐ Verify that there are no leaks from hydraulic hoses or tubing.

☐ Verify that the hydraulic swivel, inside the pedestal assembly, is not leaking hydraulic fluid.

4.3 Main Hoist Rated Load Test

- Pick up a test weight of 20,000 (+0 -1000) pounds using the Main Hoist hook.

- Raise and lower the test weight through 10 complete cycles, and through as large a hoisting range as practicable.

- Stop and hold the test weight for 30 seconds once in the up direction, then once in the down direction. Do this one time during 3 of the 10 cycles.

☐ Verify that the Main Hoist brake stops and controls the test weight without any noticeable slippage or overheating.

☐ Verify that no unusual noise or vibration is emitted from the hoist assembly or sheaves.

- Raise and lower the boom through 10 complete cycles, and through as large a range as practicable.

- Stop and hold the test weight for 30 seconds once in the up direction, then once in the down direction. Do this one time during 3 of the 10 cycles.

- Extend and retract the boom through 3 complete cycles, and through as large a range as practicable.

☐ Verify that the luff cylinders and boom extension cylinder do not drift, leak, or bind during operation.

- Rotate the turret through 10 complete cycles and through as large a range as practicable.

- Stop rotating the turret once in the clockwise direction, then once in the counterclockwise. Do this one time during 3 of the 10 cycles.

☐ Verify the swing drive brakes stop and control the turret without any noticeable slippage or overheating.

☐ Verify that no unusual noise or vibration is emitted from the swing drives or the turntable bearing assembly.

- Remove the test weight from the Main hoist hook.

☐ Verify the Main Hoist drum, winch, and sheave attachment points (load-bearing fasteners and welds) are in good condition.

☐ Verify that the Main Hoist wire rope, end fittings, and hook assembly have no permanent deformation or damage.

☐ Verify that there are no leaks from hydraulic hoses or tubing.

☐ Verify that the hydraulic swivel, inside the pedestal assembly, is not leaking hydraulic fluid.

Part 5. Emergency Brake Release Operational Test.

5.1 Main Hoist Emergency Brake Release Operational Test

- Pick up a test weight of **2,000 pounds minimum** using the Main Hoist hook.

- Secure power to the crane.

- Position an operator on the crane turret near the hand pump and emergency manifold.

- Close the needle valve at the base of the hand pump.

- Move the main winch selector valve off of the "STOP" position.

Warning!

Slowly and carefully operate the hand pump during the following evolution.

Apply just enough pressure with the hand pump to achieve a very slow lowering speed. Take special care not to loose control of the load.

The pressure between the Emergency Release Selector Valve manifold and the brake/counterbalance valve at the hoist is released by moving the main winch control lever back to "STOP". This will set the brake and stop the load.

The hand pump pressure is released by opening the needle valve at the base of the hand pump.

- Slowly stroke the hand pump lever until the winch drum starts to turn.

☐ Verify that the hand pump is functioning properly.

- Before the load touches the deck, move the main winch selector valve back to the "STOP" position and stop the load.

☐ Verify that the main winch selector valve is functioning properly.

☐ Verify that the main winch brake is functioning properly.

- Open the needle valve at the base of the hand pump.

- Re-energize the crane, lower the load to the deck.

5.2 Auxiliary Hoist Emergency Brake Release Operational Test

- Pick up a test weight of **2,000 pounds minimum** using the Auxiliary Hoist hook.

- Secure power to the crane.

- Position an operator on the crane turret near the hand pump and emergency manifold.

- Close the needle valve at the base of the hand pump.

- Move the auxiliary winch selector valve off of the "STOP" position.

Warning!

Slowly and carefully operate the hand pump during the following evolution.

Apply just enough pressure with the hand pump to achieve a very slow lowering speed. Take special care not to loose control of the load.

The pressure between the Emergency Release Selector Valve manifold and the brake/counterbalance valve at the hoist is released by moving the auxiliary winch control lever back to "STOP". This will set the brake and stop the load.

The hand pump pressure is released by opening the needle valve at the base of the hand pump.

- Slowly stroke the hand pump lever until the winch drum starts to turn.

☐ Verify that the hand pump is functioning properly.

- Before the load touches the deck, move the auxiliary winch selector valve back to the "STOP" position and stop the load.

☐ Verify that the auxiliary winch selector valve is functioning properly.

☐ Verify that the auxiliary winch brake is functioning properly.

- Open the needle valve at the base of the hand pump.

- Re-energize the crane, lower the load to the deck.

5.3 Swing Drive Emergency Brake Release Operational Test

- Pick up a test weight of **2,000 pounds minimum** using the Auxiliary Hoist hook.

- Attach tag lines to the test weight or boom so that the test weight can be swung manually.

- Secure power to the crane.

- Position an operator on the crane turret near the hand pump and emergency manifold.

- Close the needle valve at the base of the hand pump.

- Move the swing drive selector valve off of the "STOP" position.

Warning!

Slowly and carefully operate the hand pump during the following evolution.

The amount of pressure created by the hand pump can be sensed through the amount of force required to stroke the lever.

Hydraulic lock at the swing drive motors is released by the needle valves on motor manifolds. The rate at which the boom will swing is controlled by these needle valves. Open them only enough to accomplish the test.

List or trim on the cutter may cause the boom to swing once the brakes are released and the needle valves are opened.

The pressure between the Emergency Release Selector Valve manifold and the brakes at the swing drives is released by moving the swing drive control lever back to "STOP". This will set the brake and stop the load.

The hand pump pressure is released by opening the needle valve at the base of the hand pump.

- Slowly stroke the hand pump lever until pressure can be felt on the lever.

☐ Verify that the hand pump is functioning properly.

- Open the needle valves on each of the three swing drive motor manifolds to release the hydraulic lock on the motors.

☐ Verify that the swing drive needle valves are functioning properly.

- Swing the boom 20-30 degrees in both directions, using the tag lines to move the test weight as required.

- Move the swing drive selector valve back to the "STOP" position and stop the load.

- Attempt to swing the boom again in both directions, using the tag lines to pull on the test weight.

☐ Verify that the boom will not move.

☐ Verify that the swing drive selector valve is functioning properly.

☐ Verify that the swing drive brakes are functioning properly.

- Close the needle valves on each of the three swing drive motor manifolds.
- Open the needle valve at the base of the hand pump.
- Re-energize the crane.
- Swing the boom 20-30 degrees in both directions using hydraulics to move the test weight.

☐ Verify that the swing drive needle valves are functioning properly (they are fully closed).

- Lower the test weight to the deck.

☐ Before continuing, verify that all three Emergency Release Selector Valves are in the "STOP" position. Verify again that the needle valves on each of the three swing drive motor manifolds are closed.

Part 6. Label plates and test reports.

- Document the satisfactory completion of the procedure by fabricating and installing a label plate and submitting a report as specified in MLCA Std Spec 5000_STD.